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PALSY OF THE EXTRAOCULAR MUSCLES IN EXOPHTHALMIC GOITRE.¹

WITH THE REPORT OF A CASE.

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IN addition to the usual ocular signs which constitute part of the cardinal symptoms of Graves' disease—*i. e.*, the exophthalmus and the so-called Graefe, Stellwag, Dalrymple, and Möbius signs, and which are dependent upon various inco-ordinations and weaknesses of certain parts of the nervous mechanism of the eye, actual palsy of one or more of the extrinsic ocular muscles is sometimes met with. The notes of a case of this nature are appended.

Sarah L., a housekeeper, aged forty-three years, was brought to the service of the writer at the Polyclinic Hospital by Dr. O. C. Heffner, of Pottstown, Pa., in October, 1902, upon account of poor sight of several months' duration. The patient had been in rather poor health for ten years or more, suffering from palpitation of the heart and nervousness, but had had no prolonged or serious illness other than attacks of muscular rheumatism. Her appetite was good and her bowels regular; she still menstruated regularly, though she had always been subject to more or less uterine trouble. She had had seven children, five of whom were living and well; she had had no miscarriages. She said that her sight had always been good until two months before, when she suddenly saw double, the double vision persisting without remission ever since. Though dizzy at times, she did not complain of nausea, nor was she subject to attacks of vomiting. She had suffered considerably from supra-orbital and temporal head pains for several years, which were at times quite violent.

She was not aware of ever having had a swelling of the neck. Dr. Heffner had noticed a prominence of the eyes, especially of the left, for several months previously. Upon examination both eyeballs were found to be slightly proptosed, the left being slightly more so than its fellow. As shown in the accompanying photograph, the palpebral fissures were widened, there being about 2 mm. of white

¹ Read before the Ophthalmological Section of the College of Physicians of Philadelphia, January 19, 1904.

sclera showing between the upper lid and the superior border of the cornea in both eyes. It was noted that the patient fixed with the right eye, the left being rotated somewhat downward and outward. The Graefe lid sign was at times present in both eyes, but at others, though carefully searched for, it could not be demonstrated. When the patient was asked to follow the examiner's finger in testing the excursions of the eyes, it was found that the left eye could not be rotated above the median line; external and internal motion also was restricted; downward movements were good. All of the motions in the right eye were performed normally.



Exophthalmic goitre, showing exophthalmus, the Dalrymple sign, and paralysis of the external, superior, and inferior rectus and inferior oblique muscles of the left eye.

The pupils were 3 mm. in size and the irides responded equally and freely to light and accommodation stimuli. The ophthalmoscope showed about 1 D. of hypermetropia in each eye with some astigmatism. The optic nerves were somewhat gray, but there was no neuritis. The retinal veins were rather fuller than normal and pulsated upon the disk only. Vision equalled $\frac{5}{6}$ in the right eye and $\frac{5}{9}$ in the left. There was no restriction of the visual fields.

From a study of the double images, it was apparent that there was a palsy of the left sixth nerve and of that portion of the third nerve of the same side which supplies the inferior oblique and the superior

and inferior recti muscles. The patient was referred to the nervous clinic of the hospital for further study, where Dr. Spiller examined her, with the following result: "Patellar reflex exaggerated upon each side. Ankle clonus not obtained on either side. Achilles reflex in Babinski position distinctly exaggerated on each side and equal. Babinski reflex doubtful on each side, toes not moving distinctly in either direction on irritating sole of foot, tendency being to extension. Resistance to passive motion in lower limb not diminished in leg or thigh on either side. Sensation for touch and pain normal in all parts of body. Grasp of hand normal on each side. Triceps tendon reflex, biceps tendon reflex, and wrist reflex exaggerated and equal on each side. Gait normal. Station erect, normal, even with eyes closed. Motion of upper limbs normal in all directions. Resistance to passive movements at elbows normal. Tongue protruded straight in median line and movements free in all directions; no marked atrophy; no fibrillary tremors. Movements of facial muscles normal on each side. Patient has difficulty in drawing either corner of mouth upward separately, but in showing teeth the muscles of mouth are drawn up well. The eyelids are closed normally and the forehead wrinkled properly on each side. Masseter contracts firmly on each side. Sense of smell seems to be intact. Hearing seems to be good on both sides. Pulse 110 to 120. Slight prominence of thyroid."

An examination of the urine showed specific gravity 1026; no albumin or sugar.

A diagnosis of Graves' disease with the unusual finding of palsy of the extraocular muscles was made, and with the concurrence of Dr. Spiller the patient was advised prolonged rest in bed and specific treatment. This was adopted, but after a few weeks' trial the patient tired and left the hospital without any apparent change in her condition.

Instances of palsy of the extraocular muscles in Graves' disease are rare, but a search through the literature reveals a number of cases somewhat similar to the one just reported. Quite lengthy reference to these may be found in several interesting monographs, of which the most notable are by Ballet,¹ Liebrecht,² Buschan,³ Mannheim,⁴ and Möbius.⁵ It would appear, from the cases reported and cited by these authors, that the paralysis may affect a single muscle or group of muscles of one eye, or even all the extrinsic muscles of one eye; and that occasionally one or more muscles of both eyes are simultaneously affected. Palsy of the ciliary muscle or iris is not recorded; nor of any of the associated movements of the eyes with the exception of reports by Schmidt-Rimpler⁶ and

¹ *Gaz. hebdomadaire*, 1898, p. 558.

² *Klin. Monatsbl. f. Augenheilkunde*, 1890, p. 492.

³ *Dissertation*, Leipzig u. Vienna, 1891.

⁴ *Dissertation*, Berlin, 1891.

⁵ *Zeitschr. f. Nervenheilkunde*, vol. I, p. 460.

⁶ *Nothnagel's System*, 1898.

Vossius¹ of cases of paralysis of convergence. Palsy of the levator palpebræ superioris in conjunction with palsy of the other branches of the third nerve is rare; but is rather more common without such association. The palsy may come on early in the course of the disease, but in most cases it is a late manifestation; though usually persistent, it may be but a transient condition, the muscles regaining their full strength.

The palsy may occur without paralysis of other cranial nerves, or it may be associated with a similar affection of one or more of them; thus Bristowe² has recorded the case of a young man who developed the symptoms of ophthalmoplegia externa three years after the ordinary symptoms of Graves' disease had manifested themselves. There was also right hemianæsthesia, with color blindness and loss of taste and smell on the same side, some palpitation and dyspnœa with headache and sickness. After a period of some months, epileptic fits came on, and later on hemorrhages from both ears. Death finally occurred from bronchitis. Autopsy was negative.

Similarly in a case reported by Warner³ there was binocular external ophthalmoplegia with palsy of the facial and trigeminal nerves. Jendrassik⁴ saw paresis of the muscles of mastication in addition to palsy of the rotary muscles of both globes, as well as most of the muscles of the face and palate. Of interest in this connection also are four cases reported by Ballet:⁵ the first, the subject of severe hysteria, in addition to ophthalmoplegia externa, presented a number of bulbar symptoms—*i. e.*, palsy of both facials and paresis of the hypoglossus. In the second, also the subject of severe hysteria, there was right-sided hemianæsthesia and loss of smell and taste on the same side. Autopsy showed no visible change in the central nervous system. In a third case, in addition to palsy of both external rectus muscles, there was right-sided hemiplegia and hemianæsthesia, with epileptic attacks. The fourth case was an instance of ophthalmoplegia externa with paresis of the facial and hypoglossus. Chevalier⁶ saw palsy of the externi and oblique muscles associated with disturbance in the supply of the fifth and seventh nerves and of speech.

In a case of Maude's⁷ the lesion seemed to spread over the entire region of the nuclei of the extraocular muscles, and those neighboring upon them, paresis of the external rectus, and probably of the superior oblique, being preceded by palsy of the facial and quickly followed by general ophthalmoplegia.

Stellwag's⁸ case was one of paralysis of the lateral rotators (the

¹ Beiträge zur Augenheilkunde, 1895, vol. xviii.

³ Medical Times and Gazette, 1882, p. 540.

⁶ Loc. cit.

⁷ St. Bartholomew's Hospital Reports, 1892, vol. xxvii.; also Brain, 1892, Autumn, p. 424.

⁸ Wien. med. Jahrb., 1869, p. 25.

² Brain, 1886, p. 313.

⁴ Arch. f. Psych., 1886, vol. xvii. p. 301.

⁵ Thesis, Montpellier, 1891.

ocular axes being parallel and convergence undisturbed) and later palsy of both externi with convergent strabismus and diplopia developed with transient anæsthesia and restricted movement of the left half of the upper legs.

In a case reported by Féréol,¹ of a man, aged forty-one years, six months after the appearance of the initial symptoms of exophthalmic goitre, there were headache, vomiting and dizziness, tremor, with disturbed gait and a disposition to face to the right; then diplopia, the result of right-sided trochlearis palsy. There was also right-sided diminution of motion and hyperalgesia, while on the left side there was a diminution in sensation of pain.

In a recent number of the *Deutsche medicinische Wochenschrift*, August 13, 1903, Voss, of St. Petersburg, has reported two additional cases of palsy of the extraocular muscles in exophthalmic goitre. The palsy in the first case had affected the superior and external rectus muscles of the right eye and the inferior and external rectus muscles of the left eye. There was also a partial palsy of the right facial nerve, with some cerebral symptoms.

The second case exhibited multiple lesions in the muscles of both eyes, the superior rectus muscle of the right eye being particularly affected.

The same author refers to a case of Bartholow where there was ptosis in association with gangrene and neuritis of the lower extremities.

Dyson² reported a case of a man with the symptoms of incipient Graves' disease, in which, in addition to slight exophthalmus and Graefe lid signs, there was slight internal convergent strabismus and dilatation of the pupil of the left eye. The patient was a chronic alcoholic.

Bruns³ saw ptosis on the left side, with palsy of the superior recti in both eyes, with the cardinal symptoms of exophthalmic goitre, but as the patient was the subject of a chronic nephritis, it was thought that the nuclear lesion might be referable to this source and not to the Graves disease.

Wilbrand and Saenger⁴ report a case with slight ptosis on the left side; with retraction of upper lid, with Graefe lid sign, upon the right side. This was explained by a bilateral affection of the nuclei of the levator—i. e., an irritation of the levator on the right and a palsy on the left side.

De Giovanni⁵ has reported a case of unilateral exophthalmus, as a consequence of palsy of the extraocular muscles, especially of the rectus superior, in which goitre and other classical symptoms of Graves' disease were present.

¹ Gaz. hebdom., 1889, p. 112.

² British Medical Journal, January 15, 1887.

³ Anzeigen zur Zeitschrift für Psychiatrie, Bd. 1x., Heft 5.

⁴ Die Neurologie des Auges, vol. 1 p. 47.

⁵ Referat aus der Deutschen medicinischen Zeitung, 1889, No. 98, p. 1113.

In addition to these cases of more or less complete ophthalmoplegia externa, others, though more uncommon, of palsy of a single eye muscle have been reported. These have been grouped by Buschan¹ as follows:

1. Cases in which diplopia was complained of, but the muscles at fault not ascertained: Trousseau Smith, Chvostek, Stellwag, Impaccianti, Strümpell, F. Müller, and Lang-Pringle.

2. Cases of palsy of the rectus internus: West, Homén, Cohen, Westedt and Romberg, rectus interni of both eyes; Schoch and Rothmann, rectus internus and externus.

3. Cases of palsy of the rectus externus: Kurella, Mackenzie (several cases), Eulenburg, Stellwag, Makeig Jones, Liebrecht, Dyson, Ballet, and Cohen.

4. Cases of palsy of the rectus superior: Sollier, Fischer-Degranges, Kahler, Roth, Schlesinger, and Chvostek.

5. Cases of palsy of the trochlearis: Féréol.

6. Cases of palsy of the levator palpebræ of both eyes: Maude and West.

It is evident from a recital of these cases that palsy of the extraocular muscles is not of very rare occurrence and as such is not to be considered as accidental but rather as part of the morbid process of Graves' disease. Just what this part is and what the character and where the seat of the lesion may be, cannot in the still uncertain state of our knowledge regarding the nature of Graves' disease be asserted with certainty, though it would appear at least that in those cases where there was more or less complete ophthalmoplegia externa, and especially in those in which there were associated lesions in the facial, hypoglossus and glossopharyngeal nerves, that the palsy was of central origin, originating in the nerve nuclei. This reference of the palsies to an involvement of the nerve nuclei is an observation of great interest bearing upon the pathology of Graves' disease, for it is additional proof of the central origin of the affection; and while the nature of the morbid process in the nuclei which occasions the extraocular palsies is still to be determined it is probable, as the palsies are sometimes transient and the autopsies which have been made (Bristow, Ballet) have failed to reveal any visible pathological change, that the morbid process is only functional, consisting of an irritation of the centres by toxins which may, as evidenced by the pathological changes which occur in the thyroid gland in so many of these cases, be generated in the system as the result of some perversion in the normal action of that structure.

¹ Dissertation, Leipzig and Vienna, 1894.